

TO: DIERS Users Group Members

FROM: Harold Fisher

SUBJECT: **Benchmarking Our Understanding: Application of DIERS Vapor Disengagement Methodology - The Coupling Equation and Two-Phase Flow Models**

As a way of benchmarking the understanding of DIERS Two-Phase Methodology (such as liquid swell, coupling equation and flashing critical flow etc.), I am asking each of you to make an estimate of the initial or peak mass flow rates (kg s^{-1}) measured in the attached Blowdown Benchmark Experiment. The 50ℓ vessel ($D = 400 \text{ mm}$ and $H = 400 \text{ mℓ}$) with a connecting straight vent line ($D = 20 \text{ mm}$ and $L = 1800 \text{ mm}$) is initially 75% full with either saturated demineralized water or foamy water with 1000 ppm detergent prior to blowdown ($P_o = 5 \text{ bar}$ and $T_o = 152^\circ\text{C}$). The vent line nozzle is an ideal entrance and the relative roughness should be taken as that of a smooth tube (i.e., $\varepsilon / D \cong 0$). If you have questions about the benchmark experiment, please contact Dr. Hans Fauske (630-887-5200 or fauske@fauske.com). We are looking forward to seeing your answers ($x \text{ kg s}^{-1}$ for the non-foamy and $y \text{ kg s}^{-1}$ for the foamy condition) accompanied with a brief statement of your calculational methodology (hand calculation, computer simulation, etc.).

Please submit your answers to Mr. Harold Fisher and Dr. Hans Fauske a week ahead of the upcoming DIERS Users Group Meeting (5/7 - 5/9, 2007). Dr. Fauske will summarize the results as well as discuss the DIERS two-phase methodology in a 2 hour presentation after lunch on May 8, 2007.

We look forward to an exciting discussion of how well as a group we can apply the DIERS two-phase methodology.

Blowdown Benchmark Experiment

